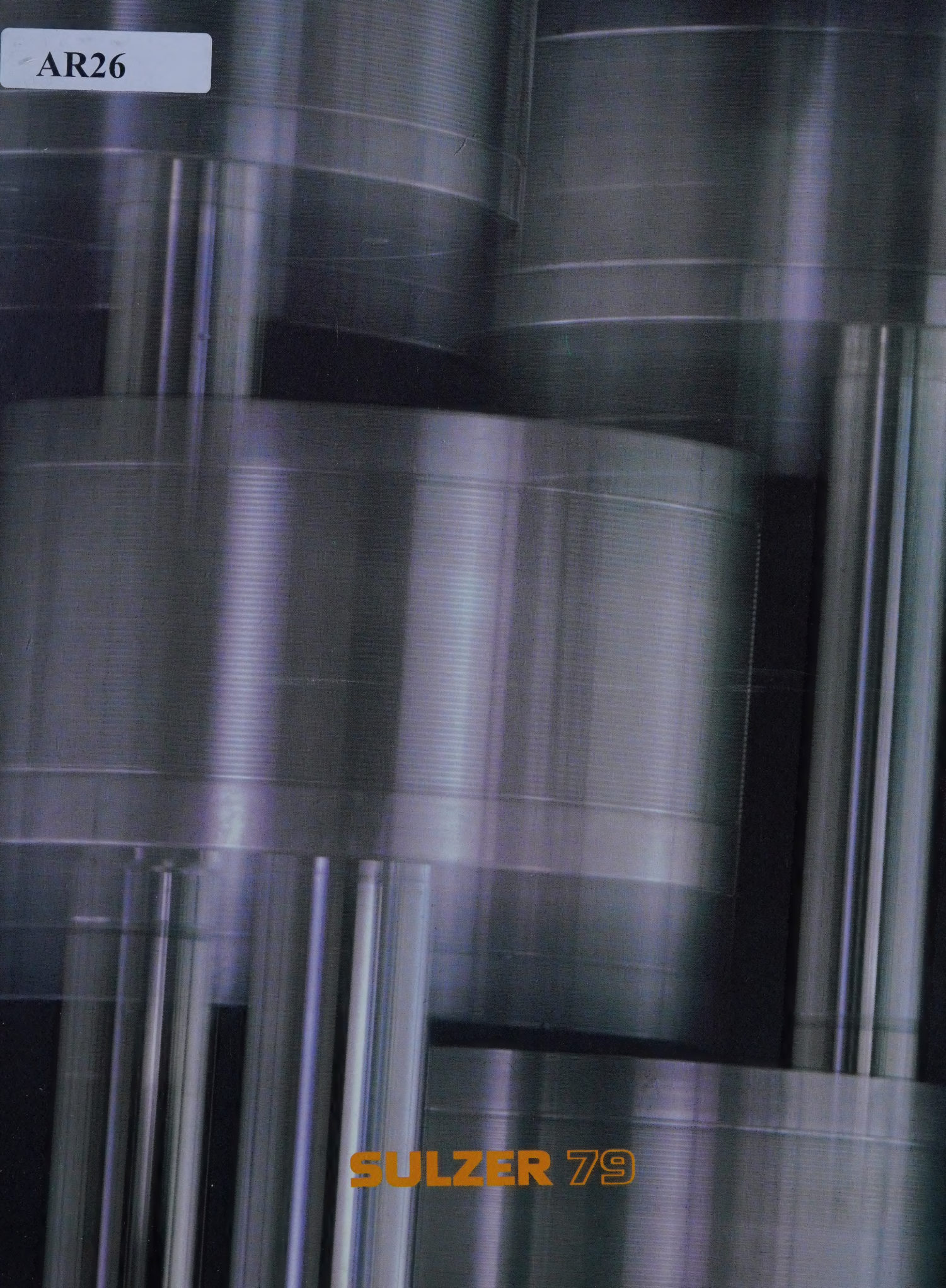




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SULZER 79

SULZER

Annual Report 1979 Condensation

Sulzer Brothers Limited
Winterthur
Switzerland

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From the Chairman's Address to the Shareholders

Taken as a whole, international economy in 1979 developed satisfactorily for our business activities. In particular, a certain stabilization of currency relations created improved conditions for capital investments by our customers. Demand increased for various products of the Group. Business became noticeably more lively, but fierce competition remained, and pressure on prices for most of our products continued unabated.

Consolidated incoming orders for the Group reached a total of 3514 million Swiss francs and thus exceeded the previous year's level of 3027 million Swiss francs by 16%.

Invoiced Group sales amounted to 3109 million Swiss francs as against 3481 million Swiss francs in 1978. This reduction is mainly due to a lower turnover on the part of Sulzer Brothers Limited. Work in hand in terms of hours stabilized in the various factories of the Group. Employment was secured for our personnel throughout the whole year, although the production facilities of our works were not fully utilized.

Personnel employed by the Group increased by 0.8%. The Group had 33876 people on the payroll at the end of 1979, compared with 33621 in the previous year.

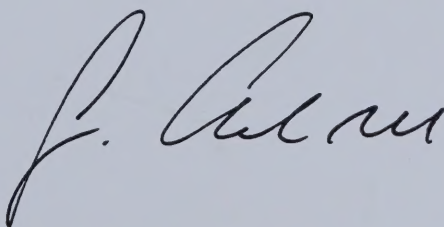
As a result of our efforts to strengthen our *position in North America*, various agreements were entered into regarding the participation in existing firms or the establishment of new ones.

Our minority holding in Camsco Inc., Dallas, Texas (USA), was expanded to become a majority. Camsco is engaged in the manufacture, sale and maintenance of electronic devices and equipment for automation, mainly in the field of textiles processing.

Sulzer and Escher Wyss will have a stronger presence in Canada as a result of a joint venture agreement concluded with Dominion Bridge Company Limited, a member of the worldwide Canadian Pacific Group. The joint company, established at the beginning of 1980, has been granted a licence covering all products in the hydraulics sector of Escher Wyss, Zurich. In this connection, it may be emphasized that the STRAFLO turbine, a newly developed low-head water turbine with outer rim generator, is of particular importance to the North American market. A first order for a large turbine of this type, to be installed at Annapolis, Canada, has in the meantime been received by the newly formed company.

At the same time a joint company was established by the Sulzer Group and Diamond International Corp., New York. This new company will make and sell paper machinery in the United States of America and Canada, under the name of Escher Wyss Manchester.

Although certain signs indicate that business activity will be lively in 1980, it is extremely difficult to make a *forecast* as to the Group's business in the future. Our prospects mainly depend on whether a certain stability of currency relations can be maintained, and on how inflation will develop, which has an increasing trend also in Switzerland. Additional imponderables are the oil supplies to the West, the trends of prices for raw materials, as well as possible international disturbances of political or economic nature. Nevertheless, we are confident that on the whole we shall be able to maintain and enhance our position, in spite of the prevailing uncertainty.



George Sulzer, Chairman of the Board



Sulzer technology—from the raw material to the high-performance product.

Board of Directors

George Sulzer
Dr. Herbert Wolfer

Chairman of the Board
Vice-chairman

Dr. Oswald Aepli
Dr. Dr. h. c. René Bühler
Dr. Alfred Hartmann
Dr. Samuel Koechlin
Alfred Schaffner
Peter Schmidheiny
Dr. Dr. h. c. Edwin Stopper
Hans Strasser
Dr. Alfred E. Sulzer
Dr. Henry Sulzer
Dr. Peter Sulzer
Philippe de Weck

Chairman Swiss Credit Bank
Chairman Bühler Brothers Ltd.
Vice-chairman F. Hoffmann-La Roche & Co. Ltd.
Chairman of the Executive Committee CIBA-GEIGY Ltd.

Chairman Escher Wyss Ltd.
Chairman Bank Leu Ltd.
Chairman Swiss Bank Corporation
Chairman Handelsbank N. W. Zurich

Scientific consultant
Chairman Union Bank of Switzerland

Auditors

Schweizerische Revisionsgesellschaft, Zurich

Corporate Executive Management

Rudolf Schmid
Marcel Züblin
Artur Frauenfelder
Pierre Borgeaud
Dr. h.c. Max Steiner, *Textile Machinery* (until 7. 5. 1980)
Peter Sulzer (from 7. 5. 1980)

Corporate Staff

<i>Planning</i>	Kaspar Vogel
<i>Research</i>	Dr. Jost Hännly
<i>Purchasing</i>	Fred Oederlin
<i>Sales Organization</i>	Dr. Hans Plüss
<i>Secretary General, Publicity</i>	Dr. Max Trechsel
<i>Personnel</i>	Dr. Jean Bacher
<i>General Counsel</i>	Dr. Hans-W. Greminger
<i>Finance and Accounting</i>	Erich Müller Anton Grüniger Hans Turtschi
<i>Organization, Data Processing</i>	Pascal Marchal

Divisions / Group Departments

Winterthur Engineering Works

Textile Machinery

Heating and Air Conditioning

Pumps

Thermal Turbomachinery

Foundries

*Industrial Electronics,
Water and Waste-Water Treatment*

Plant Engineering and Contracting

Escher Wyss Zurich

Escher Wyss Ravensburg

*Swiss Locomotive and Machine Works
Winterthur*

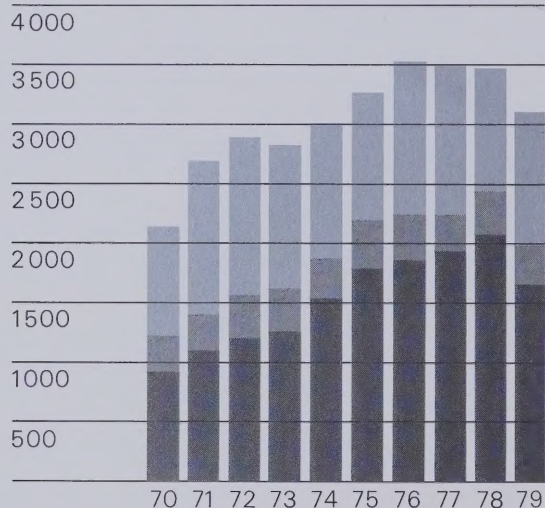
Management

Othmar Hegi Peter Sulzer (until 7. 5. 1980) Felix van derSchaar (from 7. 5. 1980) Gottlieb Wolf Jan Arie Smit Jürg Bienz	<i>Head of Division Diesel Engines Sales Diesel Engines Sales Diesel Engines Technology Diesel Installations Thermal Power Plants and Nuclear Engineering Refrigerating Plants, Compressors and Process Engineering Production Corporate Buildings and Technical Services</i>
Rudolf Bleuler Dr. Georg Gerber Werner Gehrig	
Walter Schneider Rudolf Leutert Walter Fässler	<i>Head of Division Weaving Machinery Sales Weaving Machinery Controller</i>
Jean-Pierre Sandoz Adolf Knapp	<i>Head of Division Department Switzerland</i>
Anton Reinhart (until 31. 3. 1980) Richard Burger (from 1. 1. 1980)	<i>Head of Division Head of Division</i>
Gerhard Kurz	<i>Head of Department</i>
Dr. Res Küpfer	<i>Head of Division</i>
Alfred Lüthi	<i>Head of Department</i>
Dr. Rodolphe Ecabert	<i>Head of Department</i>
Dr. Victor Frey Dr. Ernst Mühlemann Dr. August Guyer Emil Lutz Jakob Wydler	<i>Head of Division Hydraulic Machinery Process Engineering Production Division Controller</i>
Peter Dill Hans-Jürgen Günther Max Henzi	<i>Head of Division Paper Machinery Controllable-Pitch Propellers</i>
Klaus von Meyenburg Dr. Mario Knüsli	<i>Head of Division Division Controller</i>

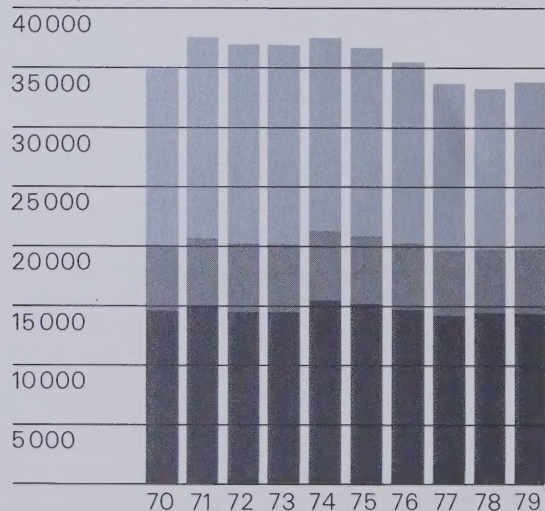
Products

Marine diesel engines Stationary diesel engines Thermal power plants High-pressure steam generating plants Medium- and low-pressure boiler installations Combined cycle power plants Components and systems for nuclear power plants Valves and control systems, spherical pressure vessels Irradiation and hygienization plants Refrigerating plants, cryogenics Heat pumps, heat exchangers, cooling towers Distillation, absorption, mixing processes Piston compressors, vacuum pumps assigned: Medical engineering
Weaving machines Circular knitting machines Planning of textile mills
Engineering and contracting for heating, air conditioning, plumbing and fire protection
Pumps for power generation, liquid transport and industry
Turbocompressors—centrifugal and axial types Gas turbines Vacuum blowers, expanders
Castings of every kind, size and alloy, in one-off or batch production, in cast iron, SG iron, steel and non-ferrous metals, also precision castings
Electronic regulating and control devices, instrumentation Water and waste-water treatment plants
General plant engineering and contracting
Water turbines, storage pumps, pump-turbines Thrust bearings, penstocks and manifolds, closing devices Controllable-pitch marine propellers Power-recovery plants Evaporation and crystallization plants Industrial centrifuges, decanters, drying and cooling units Nipco® deflection-compensation rolls Plants for the pickling of metals Asbestos-cement manufacturing plants Plants for the pulp, paper and board industry Plants for the manufacture of mill board
Electric and diesel traction vehicles for adhesion and rack railways Gears, light-metal castings

Total value of business invoiced
in million Swiss francs

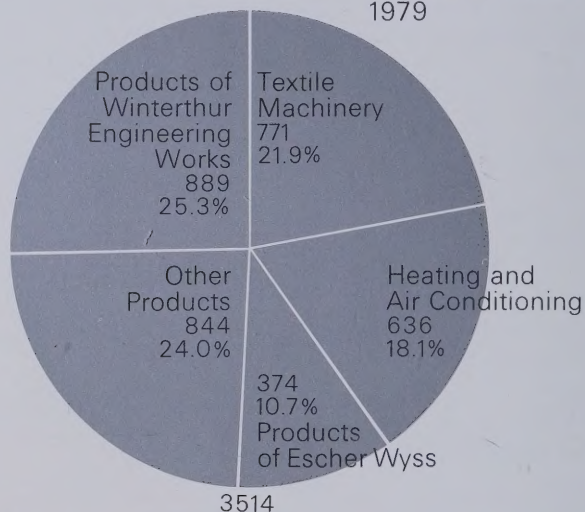


Personnel employed
during the past ten years

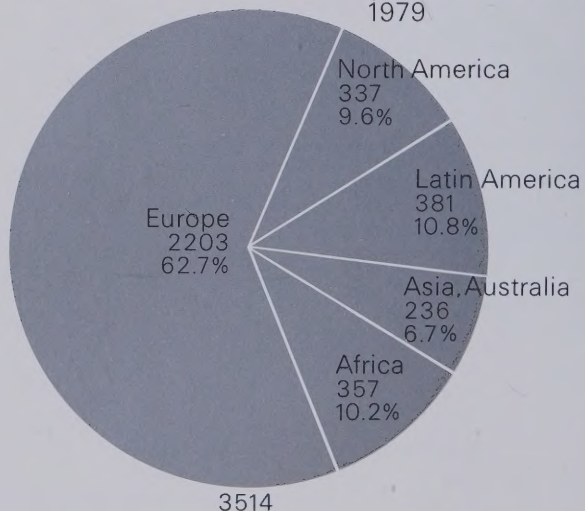


Sulzer Brothers Limited, Winterthur
 Swiss Companies of the Group
 Sulzer Group of Companies

The orders received may be classified as follows:
(in million Swiss francs)
1979



The incoming orders originate from the following
market areas:
(in million Swiss francs)
1979



Highlights of the Financial Results

Figures in Swiss francs

1 US\$ = Sfr. 1.60
1 £ Sterling = Sfr. 3.50

1979

1978



Sulzer Brothers Limited, Winterthur

Orders received	1 821 439 000	1 404 011 000
Sales invoiced	1 645 120 000	2 072 319 000
Net profit after taxes	32 720 000	34 347 000
Dividend	29 400 000	29 400 000
Capital and reserves	611 000 000	608 000 000

Sulzer Group of companies

Orders received	3 514 115 000	3 027 106 000
Sales invoiced	3 108 874 000	3 481 200 000

Personnel employed at year end

<i>Sulzer Brothers Limited, Winterthur</i>	14 373	14 473
<i>Sulzer Group of companies</i>	33 876	33 621

Group Accounts

Group Profit and Loss Account

Figures in million Swiss francs

1 US\$ = Sfr. 1.60
1 £ Sterling = Sfr. 3.50

1979

1978



Earnings

Invoiced sales	3109	3481
Change in stocks and work in progress	233	-260
Sundry income	109	110
Total earnings	3451	3331

Costs

Payments to personnel	1155	1095
Social expenditure	192	182
Direct material costs and sundry expenditure	1918	1853

<i>Cash flow</i>	186	201
Depreciation on fixed assets	151	156

<i>Group profit</i>	35	45
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Survey of the Investments in the Sulzer Group

Figures in million Swiss francs
on 31st December

1 US\$ = Sfr. 1.60
1 £ Sterling = Sfr. 3.50

1979

1978



Investments

Inventories and work in progress	2481	2241
Accounts receivable	1152	1150
Cash and securities	890	832
Total current assets	4523	4223
Land and buildings	779	775
Machinery and equipment	708	699
Financial investments	30	31
Total investments	6040	5728

Liabilities

Debentures and loans payable	687	590
Customers' advance payments on orders	1261	1089
Other liabilities	1160	1168
Total liabilities	3108	2847

Surplus of assets over liabilities

(including minority interests of 25 million Sfr.,
in previous year 19 million Sfr.)

2932 2881

Source and Application of Funds in the Group

Figures in million Swiss francs

1 US\$ = Sfr. 1.60
1 £ Sterling = Sfr. 3.50

1979

1978



Source of funds

Group profit	35	45
Depreciation on fixed assets	151	156
Cash flow	186	201
Decrease of financial investments	1	—
Decrease of inventories and work in progress	—	277
Increase of debentures and loans payable	97	5
Increase of customers' advance payments on orders	172	—
Variations of exchange rates on net working capital	2	—
Total generation of funds	458	483

Application of funds

Dividend paid for previous year	30	30
Investments in fixed assets	120	136
Increase of financial investments	—	9
Increase of inventories and work in progress	240	—
Increase of accounts receivable	2	53
Decrease of customers' advance payments on orders	—	290
Decrease of other liabilities	8	6
Variations of exchange rates on net working capital	—	5
Total application of funds	400	529

<i>Change in cash and securities</i>	58	— 46
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Explanatory Notes to Group Accounts

Basis for Consolidation and Valuation

All companies which belong commercially to the Group and come under the management and control of the Corporate Executive Management, and whose share capital is owned directly or indirectly to more than 50 per cent by Sulzer Brothers Limited, Winterthur, are included in the Group accounts. This means that Camsco Inc., Dallas, is included in the Group accounts for the first time in the year under review. On the other hand, the Japanese company Toyota-Sulzer Manufacturing Ltd., Kyowa, and Talleres Coghlan S.A., Munro (Buenos Aires), together with a few other companies in which we have minority shareholdings, are, on this basis, not included in the Group accounts, nor are they included in the Sulzer Group figures for orders, invoicing and personnel.

The individual valuation of companies in a great number of countries with quite different conditions is necessarily associated with considerable uncertainties.

In the Group accounts, the land items are valued at their original purchase prices. In the case of foreign investments, the rates of exchange valid at the time of acquisition were used to calculate the values.

Buildings, machines and equipment are taken into account at their present-day value, considering adequate age depreciation.

The financial investments represent the estimated values of our interest in unconsolidated companies.

Inventories and work in progress are valued at total cost, but not higher than the current market price.

Claims and liabilities existing between the consolidated companies are counterbalanced against each other.

With the exception of the aforementioned values for land items, the conversion of foreign currencies is based on the rates of exchange valid at the end of the respective year.

Provisions have been made to the extent corresponding to known and existing commitments. Reserves and provisions for possible future costs, which have been set aside in the balance sheets of the individual firms of the Sulzer Group, are included in the surplus of assets over liabilities.

Group Profit and Loss Account

The Group profit and loss account, which is based on the aforementioned guidelines, shows a slight increase in the total performance, a reversal of the trend over the past few years.

Sundry income includes, above all, the income from interest, rents, production of assets for own use, as well as the charging of various services to third parties.

Payments to personnel and social expenditure increased, due to worldwide inflation.

Cash flow does not take into account investment revaluation. Differences arising from variations of the exchange rates against Swiss francs for fixed assets and net working capital of our foreign companies are likewise not included. On the other hand, the effects of changes in exchange rates connected with the year's business activities have been included in the financial result for the year.

After deduction of depreciations on fixed assets, the Group profit amounts to 35 million Swiss francs. Strongly depressed selling prices for the contracts invoiced and insufficient utilization of available capacities have made the result still less positive. Contributory to this are the decrease in the profit obtained by Sulzer Brothers Limited, Winterthur, and the losses incurred by Escher Wyss GmbH, Ravensburg, and the South American companies.

Survey of the Investments in the Group

The fixed assets are somewhat higher compared to the previous year. Revaluation of the assets in the case of our foreign companies has been largely compensated by the more unfavourable rates of exchange. A majority shareholding was acquired in the American company Camsco Inc., Dallas, so that this company is being included in the Group accounts from 1979 onwards, with a consequent decrease in the amount of financial investments.

Inventories and work in progress increased, since more large contracts were in progress than at the end of 1978.

The increase of the surplus of assets over liabilities compared to 1978 includes 62 million Swiss francs for the revaluation of buildings, machinery and equipment, in order to bring them in line with present-day values. Proposed dividend payments totalling 30 million Swiss francs have already been deducted. These payments for dividends are to be made to shareholders of Sulzer Brothers Limited and to third parties having minority interests in Group companies. The changes in currency exchange rates, which occurred during 1979, brought about a decrease in the surplus of assets over liabilities (converted into Swiss francs) of our foreign companies amounting to 16 million Swiss francs. This decrease is the result of a reduction of 18 million Swiss francs in the fixed assets and an increase of 2 million Swiss francs in the net working capital.

Source and Application of Funds in the Group

As against a cash flow of 186 million Swiss francs, dividend payment amounts to 30 million Swiss francs and investment in fixed assets to 120 million Swiss francs.

Funds generated from higher customers' advance payments and the increase of debentures and loans payable exceeded the amounts required for the increase of inventories and work in progress.

Hence, there is an increase of available cash and securities.

Around the Divisions

Winterthur Engineering Works

Diesel Engines and Marine Equipment

The situation in the shipbuilding industry, which had been in a deep crisis at the beginning of 1979, improved during the second half of the year. Nevertheless, the price war in the diesel engine sector remained extremely fierce.

Mention should be made of the breakthrough of the slow-speed diesel engine, in particular the Sulzer engine, on the ship propulsion market of the United States of America. Our subsidiary company, Sulzer Bros. Inc., New York, obtained orders from American shipyards for the supply of eight slow-speed diesel engines, including three large 12-cylinder units, for container ship propulsion. These rank at present among the most powerful Sulzer diesel engines. Our slow-speed marine engines will thus, for the first time, be built in the United States. For this purpose a specific cooperation has been initiated with Allis Chalmers.

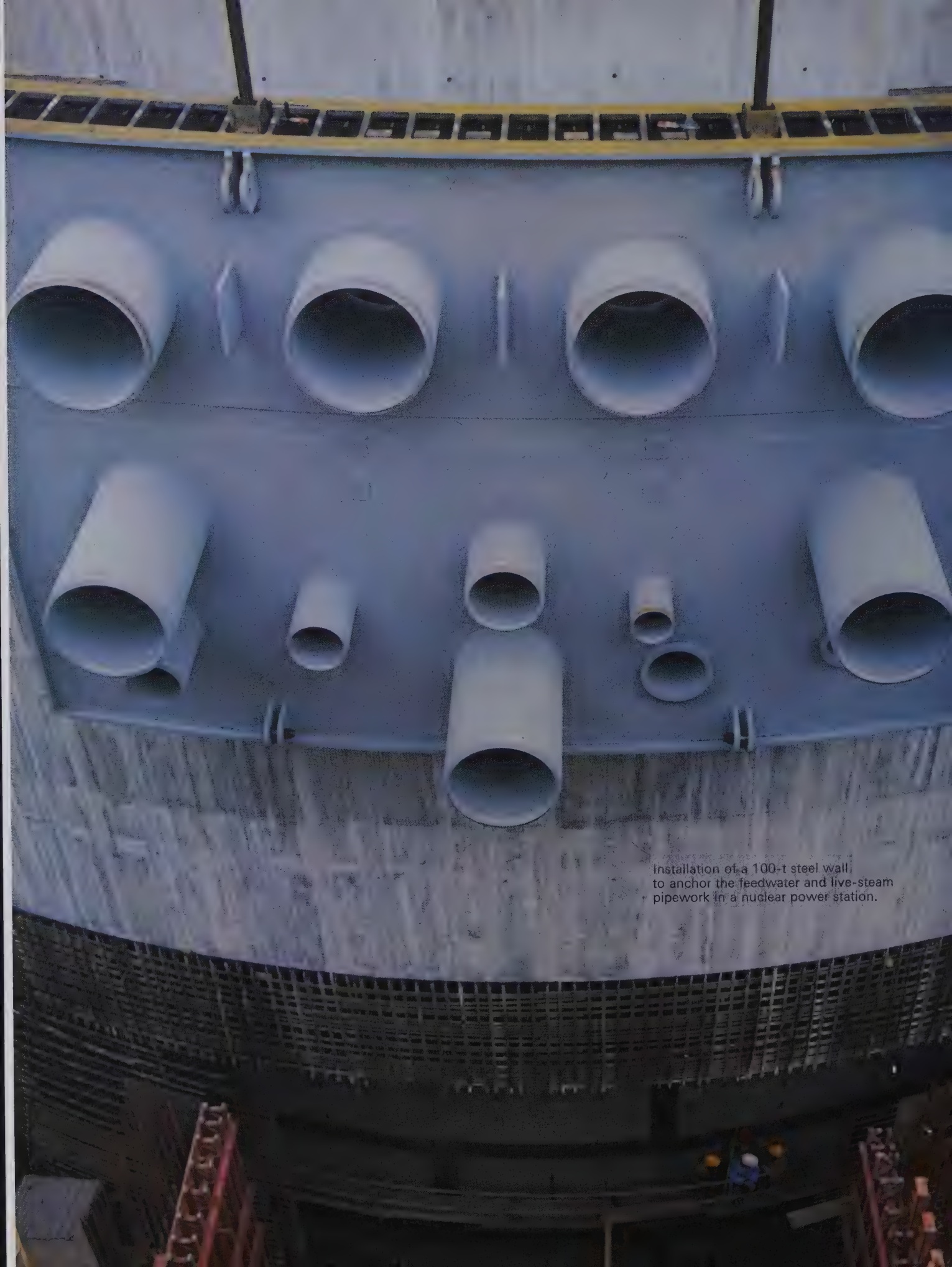
The Compagnie de Construction Mécanique Sulzer, Paris, achieved further sales success with medium-speed marine engines of type Z40/48. Construction of the world's largest diesel power station was commenced in Corsica. It will be equipped with eight large engines of type 8RNF90M and have an electrical output of 156 MW. These engines will be manufactured by our French company at its works in Mantes.

Worldwide order intake by the parent company and its licensees was clearly on the increase for the first time since the begin-

ning of the crisis in the shipbuilding industry. Orders were booked for Sulzer diesel engines for a total output of 3 200 000 kW corresponding to 4 300 000 bhp (previous year 2 500 000 kW equal to 3 400 000 bhp).

In the year under review, Sulzer diesel engines with a total output of 2 500 000 kW equal to 3 400 000 bhp (previous year 3 000 000 kW or 4 100 000 bhp) were installed in new ocean-going vessels of more than 2000 t deadweight. As in the previous year, a market share of 52% was achieved in the slow-speed engine sector. With respect to medium-speed engines, the share was increased to 8.9% (previous year 7.5%). There was a slight increase in our total market share for slow- and medium-speed marine engines to 38% in 1979 (as compared to 36% in 1978). Together with our licensees, we were able to consolidate further the leading position of the Sulzer diesel engine on the world market.

One of the reasons for the success of the slow-speed engine is its ability to burn low-grade fuels reliably and economically. Results to date confirm the great potential of our slow-speed engines for the combustion of alternative fuels. Our efforts were concentrated on further reducing fuel consumption, which was decreased by another 3%. Research work with fuels based on coal was pursued intensively. Our four-stroke engines of type AS25/30 are now being used to drive railway locomotives in the United States of America. The positive results obtained on long-term testing confirm the almost universal applicability of this engine.

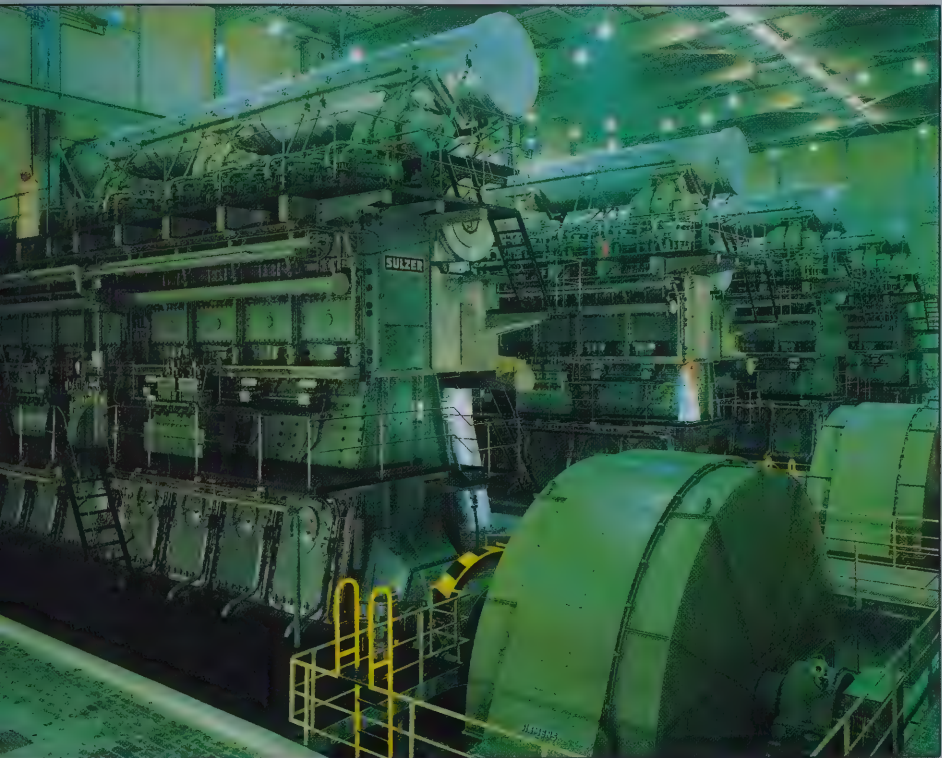


Installation of a 100-t steel wall
to anchor the feedwater and live-steam
pipework in a nuclear power station.



Research: low-cycle fatigue-testing rig. ▽

Power from crude oil:
stationary diesel-generating plant
(65 MW) in the Middle East. ▽



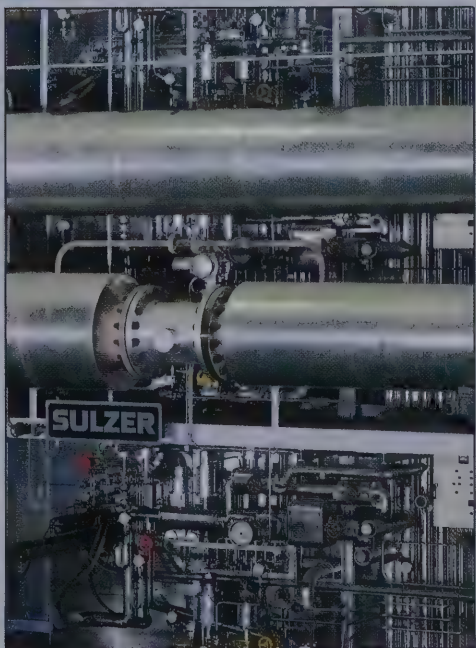
Generation of energy

Our products for this sector include:

- Diesel and steam power stations
- Hot-water and steam generators
- District heating generator stations
- Gas turbines and compressors
- Combined cycle power plants
- Components for nuclear power plants
- Valves, control systems
- Feed, condensate and heater extraction pumps
- Cooling-water and auxiliary pumps
- Water turbines
- Storage pumps, pump-turbines
- Penstocks and distributors, shut-off devices
- Emergency-generating plants



Largest branch pipe in the world
(inlet diameter 11 m) connecting
into the Escher Wyss manifold for the
TARBELA hydraulic power station
in Pakistan.



District heating increasingly utilized:
steam boiler of a district heating power station.

◁ Energy storage by air:
Sulzer compressor set (60 MW) in
the world's first air storage power station
(Federal Republic of Germany).

Residential and public buildings

We supply the following for the civil engineering contracting industry:

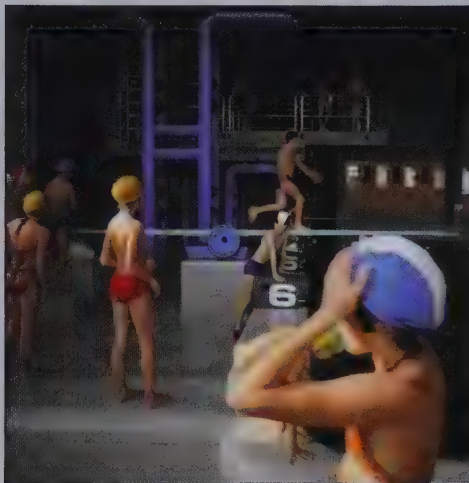
- Air conditioning and heating systems
- District heating and cooling systems
- Heat pump installations
- Solar energy exploitation
- Plumbing, fire-protection and electrical installations
- Water and waste-water treatment plants
- Pumps for clean and waste water
- Cooling and waste-heat utilization systems
- Refrigeration systems for artificial ice-rinks
- Equipment for the manufacture of asbestos cement
- Electronic control and monitoring system for building services

System for the monitoring and control of building-engineering data.

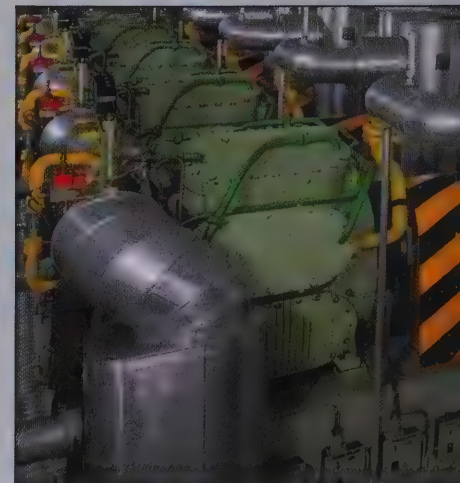
Administration building with special air conditioning requirements. ▽



Vertical pumps in a water treatment plant.



Indoor swimming pool heating with heat pumps; investment capital repaid within a few years.



Compressor set—part of a heat pump installation in an office building. ▽

Thermal Plants and Nuclear Engineering

Demand for *steam generators* to be installed in power stations increased in some countries, whereas requirements for industrial applications remained in general insignificant. Competition was very hard and prices correspondingly low. Our licensees in Japan, France, Belgium and Poland booked important orders.

There was again considerable interest in *control systems and valves* for both fossil-fuel and nuclear power stations. Intake of orders was better than in 1978, mainly for bypass systems and control valves.

In the field of *combined cycle plants* the steep rise in the cost of energy caused an ever increasing number of industrial firms to investigate the possibilities of combined power generating and heating plants. Due to the high economic efficiency of these plants we succeeded in obtaining some important engineering contracts for projects involving natural gas firing.

The considerable backlog of orders for *reactor components* continued to ensure that the workload of our technical offices remained satisfactory. Delays in the construction of nuclear power stations continue. Nevertheless, we are convinced that energy generation by this means has a part to play in future energy supply schemes, in parallel with energy saving and the search for alternative sources.

Refrigeration Plants, Compressors and Process Engineering

In the sector of *refrigeration engineering* incoming orders remained at the level of the previous year. Several orders for turn-key plants to be supplied to the Middle East were registered. In Saudi Arabia, a cold store with a capacity of 10000 t was completed at the end of 1979. With regard to turbo water chilling

units, we were able to improve our position in the market for special requirements.

Orders for *reciprocating compressors* showed a slight increase compared with the low level of the previous year. Nevertheless, the obtainable price levels were depressed. Demand for compressors to be installed on board of liquid propane gas carriers showed a marked increase.

In *process engineering*, sales of rectification columns increased to a marked extent. The largest column to date (diameter 5.3 m) equipped with Sulzer internals was successfully commissioned. An order for the supply of a heavy-water recovery plant was received from Canada. Demand for static mixing units increased further. Larger series of mixers were delivered for use in the synthetic fibre industry.

Activity in *cryogenics* has developed positively. Considerable sales successes for helium refrigeration plants were achieved in Japan, the Federal Republic of Germany, England and Italy. Our leading position in this sector was further confirmed by orders from universities and research institutes, as well as from industrial users. Several standard helium refrigeration plants were successfully put into operation.

The Burckhardt Engineering Works Ltd., Basle

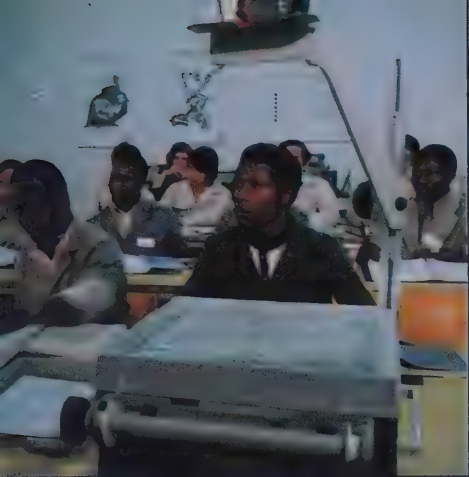
Total order intake reached almost the figure of the previous year, but prices were extremely low.

There was little demand for *hyper-compressors*, and the volume of business decreased correspondingly.

Despite continuous hard competition, it was possible to improve on the previous year's order intake for *small- and medium-size compressors*.

In comparison with 1978, there was also an increase in incoming orders for *liquid-ring vacuum pumps*.





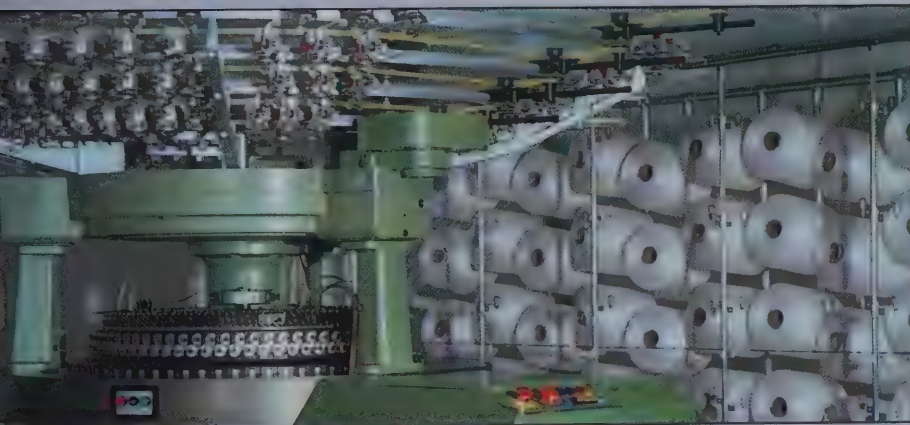
Training courses for customer personnel.

Cotton-weaving mill in Portugal with Sulzer weaving machines and air conditioning system. ▽

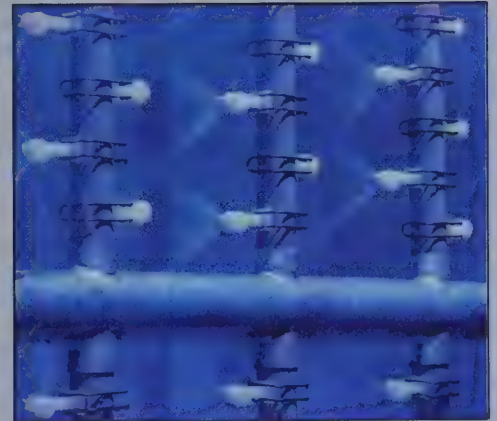
Textile industry

Apart from weaving and circular knitting machines, Sulzer supplies machinery and equipment for:

- ▬ Heating and air conditioning
- ▬ Centralized vacuum cleaning
- ▬ Electronic collection and processing of production data
- ▬ Humidification and de-misting
- ▬ Water and waste-water treatment
- ▬ Pumping
- ▬ Energy generation
- ▬ Steam and hot-water supplies



△ Sulzer Morat high-performance circular knitting machine with 144 feeders.



Humidification and dehumidification in an air washer.



Information system for production monitoring and plant management in the textile industry. ▽▽

◁◁ Corduroy manufactured on Sulzer weaving machines.

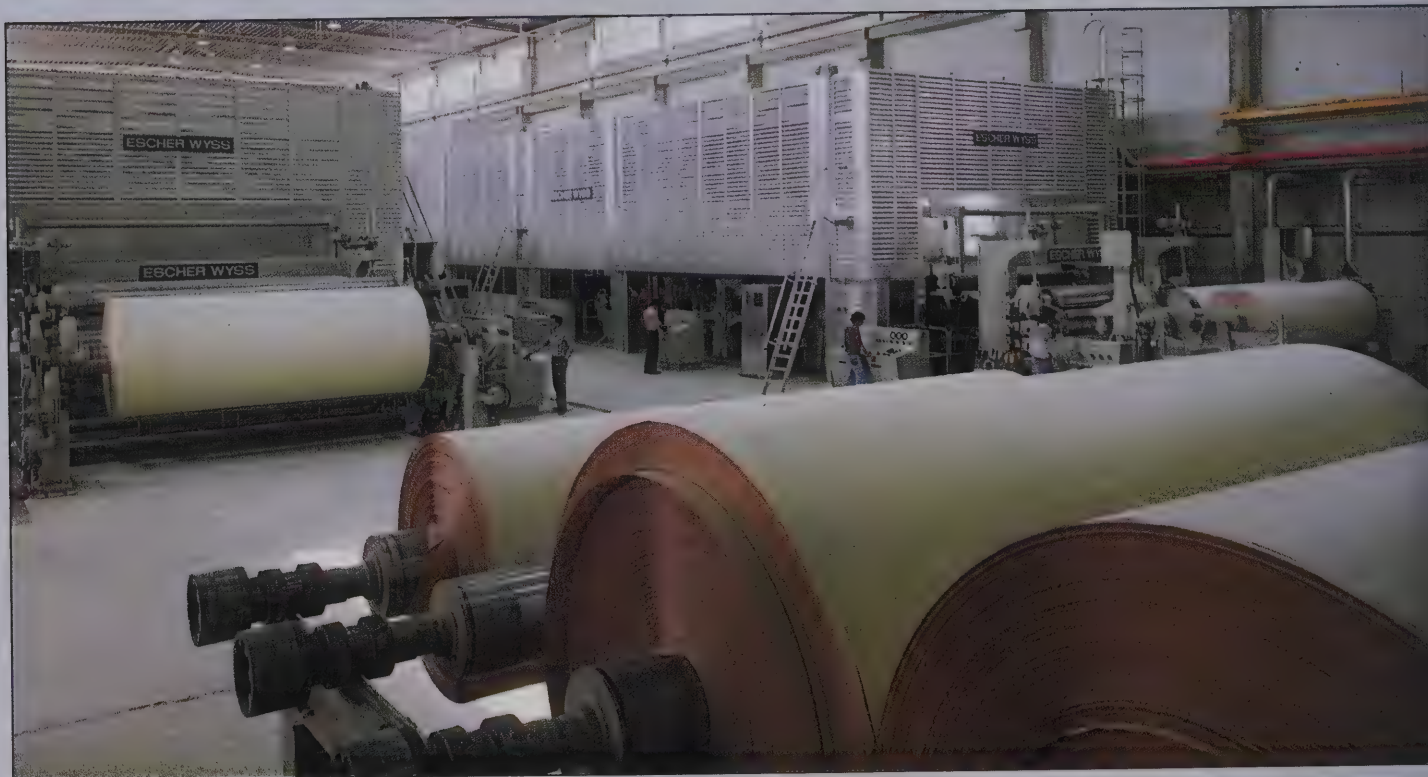
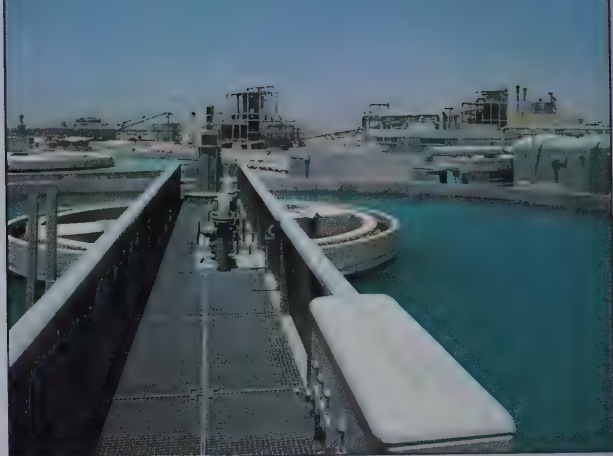
Pulp and paper industry

We can offer:

- Complete pulp and paper mills
- Continuous plants for the processing of pulp and semi-chemical pulp
- Evaporation plants for black liquors and sulphite lyes
- Stock-preparation plants
- Board machines
- Paper machines for any kind of paper
- Vacuum systems
- Steam generators
- Water and waste-water treatment plants

The latest environmental technology: waste-water treatment in a paper mill.

Escher Wyss paper machines in a large pulp and paper mill erected by a consortium led by Sulzer. ▽



Escher Wyss four-roll NIPCO press for a paper machine. This NIPCO press features line pressure control in zones across the complete web width.

Textile Machinery

During 1979 the textile industry experienced a better loading of its production capacity worldwide; hence a more favourable climate for new investments. The order level for weaving machines was good already in the first nine months of the year. A considerable number of orders was obtained during the International Exhibition of Textile Machinery (ITMA) at Hanover in October 1979. At this trade fair, which takes place only once every four years and is attended by all the leading textile machinery manufacturers, our customers were able to compare the machinery on offer. These comparisons resulted in additional business for us.

There was a massive increase in incoming orders for *weaving machines*. Pressure on the price levels, however, remained. The largest single order for weaving machines to date was received from Egypt, amounting to more than 1200 machines. Sales during the year included orders from every continent. After the United States of America and Egypt, the most important markets were Italy, Japan, France and Columbia.

A customer convention in June, and the ITMA mentioned above, had a decisive impact on the sale of our weaving machines. Apart from existing designs with improved performance, a newly developed projectile weaving machine with a weft insertion rate of 1100 m/min caused particular interest. A warp knitting machine to produce lace and curtain materials, which had been developed during the last few years and was shown for the first time at Hanover, was also well received by the customers. ITMA 1979 confirmed our leading position as a weaving machine manufacturer. Future prospects can be rated as generally promising.

The general market situation for *circular knitting machines* has not improved, although our products shown at Hanover created lively interest. In particular, sales of high-pile circular knitting machines for the manufacture of imitation furs remained good.

Heating and Air Conditioning

In Switzerland, incoming orders for heating, air conditioning, sanitary, electrical and fire-protection installations slightly exceeded the figure of the previous year. In addition to orders for conventional installations, 1979 saw an increased tendency towards plants suited to substitute oil and to save primary energy. In the heating sector this involved mainly heating systems with multi-fuel boilers, heat pumps, solar collectors, and total energy installations with combined heat and power production.

Keen interest was shown in heat recovery systems for air conditioning installations. Further progress was achieved in the development of low energy consumption systems, including their electronic control, which are matched to the building dynamics. All three branches of integral fire-protection, e.g. fire detection, sprinkler and halon extinguishing, experienced an increase in business activities. Two types of ready-to-connect domestic heat pumps were introduced on the market. These pumps use air together with other energy carriers as heat sources.

Our companies abroad had in general a good business year. Gebrüder Sulzer Heizungs- und Klimatechnik GmbH, Stuttgart, obtained more orders from the Federal Republic of Germany than in the previous year. Chauffage et Climatisation Sulzer S.A., Paris, increased the volume of business, in spite of the continuing unfavourable economic conditions in France. Nederlandsche Caliqua B.V., Tilburg, booked almost twice the number of orders as in the previous year. In Austria, Gebrüder Sulzer Gesellschaft mbH, Heizungs- und Klimatechnik, Vienna, achieved a good incoming order performance. In Great Britain, the decrease in the number of orders placed by governmental bodies was compensated by an increase in orders from private industry. Due to intensive efforts the target sales figure was exceeded in Spain. In Brazil, orders for air conditioning plants to be supplied to the textile industry still formed a significant part of

Chemical industry

We supply the following:

- Process-engineering plants
- Evaporators and driers
- Centrifuges, mixing processes
- Distillation and absorption equipment
- Refrigeration and cryogenic plants
- Process gas coolers
- Cooling towers
- Water and waste-water treatment plants
- Pumps, compressors, blowers
- Steam-generating plants
- Valves, control systems
- Air conditioning and heating systems
- Plumbing installations and fire-protection systems

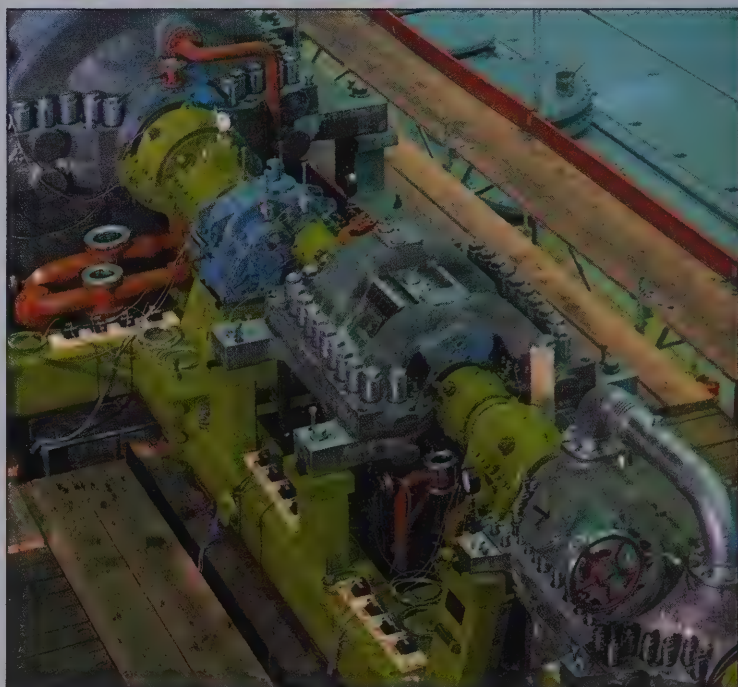
Rectification column
with heat recovery by means of
vapour compression (pilot plant).

Refrigeration plant for the liquefaction
of chlorine. ▽



Efficient pharmaceutical factories in the
tropics—thanks to air conditioning. ▷▷

Workshop testing of waste-gas expander
and two radial nitrose gas centrifugal
compressors for a nitric acid plant
in Argentina.



the incoming business, and our company in Rio de Janeiro achieved a leading position in this sector. The same applies for Argentina, where demand for textile mill air conditioning installations livened up.

Pumps

Our affiliated companies abroad are responsible for most of the business in this sector. The consolidated figure for incoming orders was above the value of the previous year. Conditions were difficult in the industrial user sector. Demand for industrial pumps remained stagnant at a low level, particularly in Western Europe, but also in Brazil. Price concessions were necessary to keep the works at Bruchsal (Federal Republic of Germany), Hengelo (Netherlands) and São Paulo (Brazil) at a satisfactory loading level. There was an improvement in the energy generation and water transport sectors, which are dealt with especially by our companies in Great Britain and France. An above average sales quota for special pumps was achieved in South Africa. A contract was received for 35 special pumps for the Mexico City water supply; these are to be manufactured in France. Sales in Switzerland were lower than in 1978.

Thermal Turbomachinery

The business for both gas turbines and turbocompressors remained under the influence of a worldwide manufacturing over-capacity. This resulted in a continuous struggle for orders at a depressed price level. While the volume of orders for gas turbines did not come up to expectations, demand and orders for turbocompressors increased during the year.

Foundries

Incoming orders increased by about 25% compared with the previous year. The increase applies particularly for business in the sectors of precision, large grey iron and steel castings.

Industrial Electronics, Water and Waste-Water Treatment

There was again an increased demand for the services and equipment supplied by the *Industrial Electronics* Department. This applied particularly to electronic equipment and systems manufactured for other products of the Sulzer Group. New electronic designs making use of microprocessors were developed for the solution of control problems in the fields of textile technology, papermaking and marine engines.

Incoming orders in the *water and waste-water treatment* field did not reach the high value of the previous year. In Switzerland, the demand for water treatment plants of the conventional type is saturated. There is, however, a new market for plants providing advanced treatment of communal waste water, and we obtained first orders for such plants. Demand was lively in the Federal Republic of Germany, and our company at Butzbach, near Frankfurt, received numerous orders from industrial and from municipal customers for water and waste-water treatment plants. There was increased interest in our filtration technology in France, but the volume of orders received during the year was small.

Plant Engineering and Contracting

The order intake in the *plant engineering and contracting* sector was low in 1979. However, a contract for the supply and commissioning of a large heavy-water production plant (annual output 250 t) for Argentina was signed in mid-March 1980. This brought the negotiations with the Argentinian National Atomic Energy Commission (CNEA), which had been started at the beginning of October 1979, to a successful conclusion. The contract will become valid after ratification by the Argentinian government.

Foodstuffs processing

Sulzer equipment and systems include:

- Heating installations
- Heat distribution systems, pumps
- Cooling systems
- Refrigeration and air conditioning systems
- Water cooling systems
- Pumps
- Filtration centrifuges
- Drum driers, cooling drums
- Fluid-bed driers
- Irradiation plants
- Brewery equipment

Cooling and air conditioning systems
for the storage of foodstuffs.



Labyrinth-piston compressors producing
refrigeration for the manufacture of ice-cream.



Salt-brine purification plant.



Processing and cooling plants for the
beverage industry.

Medical Engineering

Business was again satisfactory. The available production capacity was fully loaded. Promising further developments of long-term implants made from PROTASUL alloys are undergoing clinical testing.

Sales Organization

Changes of the market situation in important areas made it necessary to adapt our sales organization. A strengthening was initiated with regard to the People's Republic of China, with a view to ensuring the permanent presence of a technical delegate in Peking. Sales promotion in Iraq will be entrusted to a Sulzer office.

Corporate Research and Development

The Central Research and Development Department was increasingly called upon to assist in the development activities of the product groups. In addition, individual sections of our laboratories were engaged in investigations of international scope in connection with difficult and comprehensive interdisciplinary research projects, such as, for example, material behaviour at very high temperatures with regard to creep, fatigue, corrosion and wear, or the determination of the residual life of machine components subjected to high temperatures of long duration.

Activity in the new products and processes field was promoted. The apparent world-wide shortage of certain energy sources and raw materials had a decisive impact on the choice of new projects.

Escher Wyss Zurich

The *hydraulics* department achieved a good level of incoming orders, which, however, was below the high value of the previous year. Special mention should be made of orders for high-head installations from South America, in particular for the delivery of two Pelton turbines to Venezuela and of eight Pelton turbines to Columbia with an output of 175 MW each. An order for three Kaplan turbines, each rated at 42.5 MW, was obtained from Argentina. A contract for the supply of a large prototype STRAFLO turbine was received by the new Canadian company, formed at the beginning of 1980 jointly with Dominion Bridge. The STRAFLO is a new Escher Wyss development, and is a low-head water turbine with outer rim generator. Several STRAFLO turbines are to be put into operation in Switzerland and in Belgium this year.

As in the previous year, incoming orders for *process engineering* equipment and plants were insufficient, due to the continuing low level of investment in those branches of the chemical industry with which we are most concerned. The main activity centred on smaller and medium-sized projects for special installations. A few larger contracts concerned the crystallization sector, installations for the foodstuffs and animal feed industries, as well as equipment for special pulp production.

Good results were obtained on commissioning evaporation and crystallization plants. First successes were achieved from the diversification into new application areas of crystallization, mechanical separation and drying.

The NIPCO system with rotating highly flexible sleeves, already well established in multi-colour rotogravure printing, was also introduced for textile finishing during the year under report.

Crude oil and natural gas exploitation

We engineer and build installations for the extraction, transport and refining of crude oil and natural gas. Our manufacturing programme includes:

- Industrial gas turbines
- Turbocompressors
- Piston compressors
- Special and standard pumps
- Process-engineering plants
- Diesel engines

Plasma coating for a gas turbine blade: long service life at a temperature of more than 800 °C.

Gas lift platform with five gas turbine-compressor modules in the Red Sea. ▽



Gas liquefaction plant with numerous Sulzer components in Spain.



Centrifugal process pumps in a refinery.



Sulzer jet engine test cells contribute to flight safety.

Diesel-hydraulic twin-unit railcar supplied by the Swiss Locomotive and Machine Works to the Manitou and Pike's Peak Railway, Colorado, USA. ▽

Transport

Sulzer can supply:

- Diesel engines for marine propulsion and marine installations
- Automatic marine equipment
- Controllable-pitch marine propellers
- Pumps and compressors
- Locomotives and railcars



Escher Wyss controllable-pitch propellers for a twin-screw Ro-Ro-vessel (power 2×2200 kW, 2×3000 bhp).

◁ Container vessel with a twelve-cylinder large-bore diesel engine (power rating 29 600 kW, 40 200 bhp).

The *Bell Engineering Works Ltd., Kriens*, received fewer orders than in the previous year, due to delays in the finalization of various contracts, especially for hydraulic installations and asbestos-cement machines. An order for a river power station and a number of smaller contracts for the reconstruction of power stations were obtained from within Switzerland. The asbestos-cement machinery department supplied four complete sheet manufacturing lines to South-East Asia and Eastern Europe. The new plastics processing machinery section exhibited a new type of high-performance extrusion blow moulding plant for the production of plastic hollow ware at the International Trade Fair for Plastics and Rubber, in Düsseldorf. This plant was received with great interest by the industry.

Escher Wyss Ravensburg

In the *paper machinery* sector, our clients were mainly interested in new investments for printing paper machines. Demand for board machines was limited; on the other hand, increased activity on the tissue paper market led to the ordering of two tissue machines with twin-wire formers. The advanced technology of Escher Wyss was also instrumental in obtaining contracts for the modernization of paper machines. These included the supply of numerous step diffuser head boxes and NIPCO rolls, as well as tissue and machine glazing cylinders. In the stock preparation sector, most of the orders were connected with waste-paper technology. Orders received were below the figure of the previous year, because the realization of several large projects kept being postponed.

Demand for *controllable-pitch propellers* for merchant ships did not yet liven up, but the naval vessel market compensated for this to some extent. Orders were received for 24 mostly large, high-rating controllable-pitch propellers, five of which have a unit rating of 11 150 kW (15 200 bhp). Fourteen installations, among which are eight high-performance propellers of unit rating 8550 kW (11 650 bhp) for the Far East, were put into operation.

Swiss Locomotive and Machine Works, Winterthur

In 1979, orders exceeded deliveries. Total work in hand increased again, after two years of recessing tendency. This is largely due to an order for the mechanical parts of 45 four-axle, main-line locomotives from the Swiss Federal Railways.

Among others, an order for the mechanical parts of four prototype locomotives of a new series for the Swiss Federal Railways deserves special mention. These are high-performance locomotives designed for a continuous output at the wheel rim of 4472 kW (6100 hp) and a top speed of 160 km/h. In addition, several mountain railway companies, in and outside Switzerland, ordered the mechanical parts for rack railcars.

Note should be taken of the deliveries of six-axle main-line and shunting locomotives for the Swiss Federal Railways. Two locomotives and a rack railcar were supplied to the Furka-Oberalp Railway.

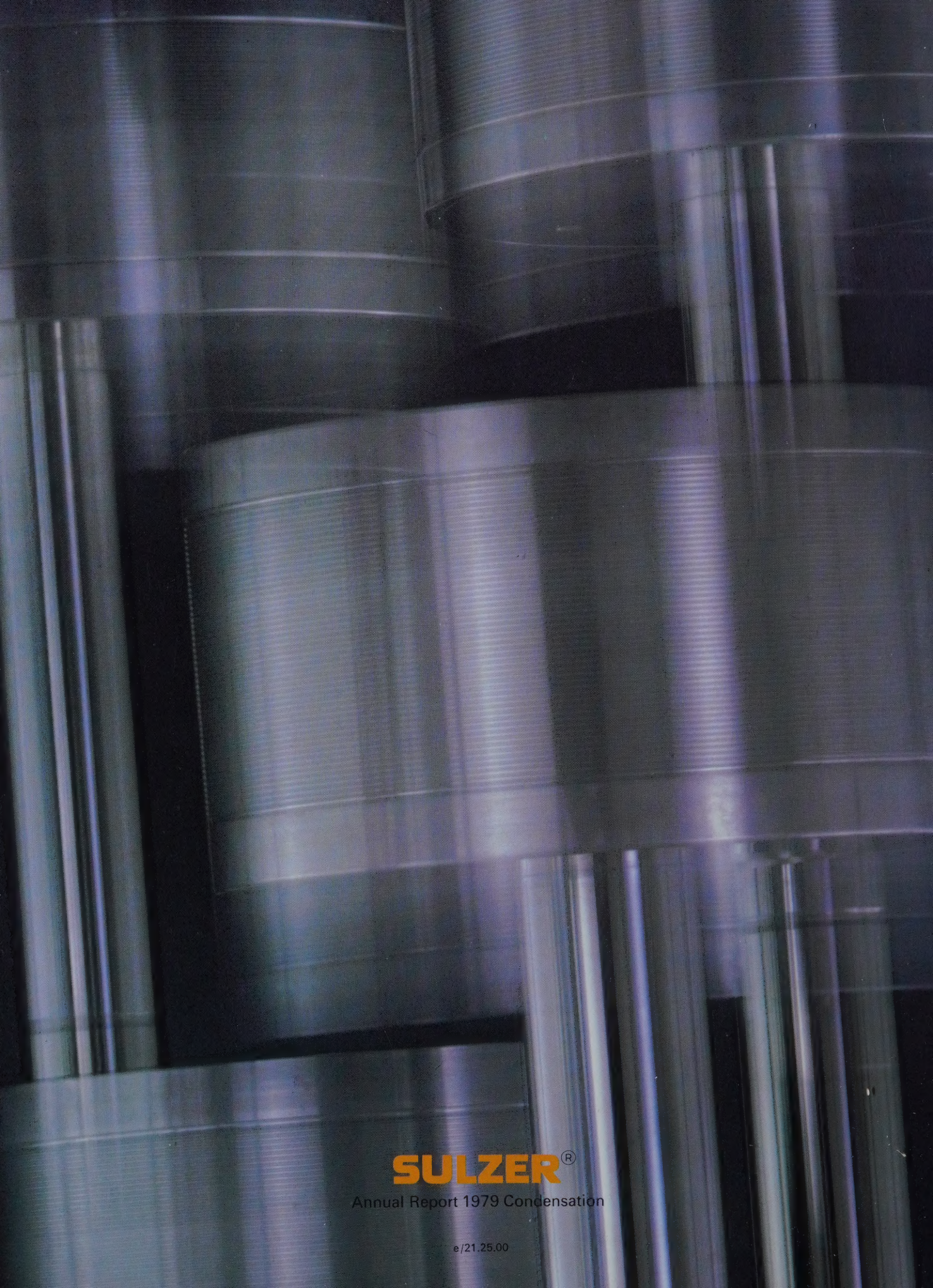
The *gear* department supplied equipment for mountain railways, as well as propulsion and steering transmissions for Swiss Army tanks.

The SULZER Group

<i>Switzerland</i>	Sulzer Brothers Limited, Winterthur Swiss Locomotive and Machine Works, Winterthur Escher Wyss Limited, Zurich Bell Engineering Works Ltd., Kriens The Burckhardt Engineering Works Ltd., Basle ELMA Electronic Ltd., Wetzikon
<i>Federal Republic of Germany</i>	Gebrüder Sulzer Holding GmbH, Filderstadt Sulzer Morat GmbH, Filderstadt Escher Wyss GmbH, Ravensburg Sulzer-Escher Wyss GmbH, Lindau Sulzer Weise GmbH, Bruchsal Gebrüder Sulzer Heizungs- und Klimatechnik GmbH, Stuttgart Gebrüder Sulzer GmbH, Hamburg
<i>France</i>	Compagnie de Construction Mécanique Sulzer, Paris Chauffage et Climatisation Sulzer S.A., Paris
<i>Great Britain</i>	Sulzer Bros (UK) Ltd., Farnborough (Hampshire)/Leeds
<i>Italy</i>	De Pretto-Escher Wyss S.p.A., Schio (Vicenza)/Milano
<i>Belgium</i>	S.A. Sulzer Belgium N.V., Bruxelles
<i>Netherlands</i>	Sulzer Nederland B.V., Amsterdam Nederlandsche Caliqua B.V., Tilburg Sulzer Delta B.V., Hengelo
<i>Norway</i>	Sulzer Brothers Norge A/S, Oslo
<i>Austria</i>	Gebrüder Sulzer Gesellschaft mbH, Heizungs- und Klimatechnik, Vienna Gebrüder Sulzer, Escher Wyss, Kältetechnik Gesellschaft m.b.H., Lauterach
<i>Portugal</i>	Sulzer Irmãos Lda, Lisboa/Porto
<i>Spain</i>	Sulzer España S.A., Madrid/Barcelona
<i>USA</i>	Sulzer Bros. Inc., New York/San Francisco/Houston Textile Machinery Division, Spartanburg Camsco Inc., Dallas
<i>Canada</i>	Sulzer Bros. (Canada) Ltd., Pointe-Claire (Montreal)/Toronto/Vancouver/Calgary
<i>Mexico</i>	Sulzer Hermanos S.A., México
<i>Argentina</i>	Sulzer Hermanos S.A.C.I., Buenos Aires
<i>Brazil</i>	Sulzer do Brasil S.A., Rio de Janeiro/São Paulo Sulzer Weise S.A., São Paulo
<i>Peru</i>	Sulzer del Perú S.A., Lima
<i>Japan</i>	Sulzer Brothers (Japan) Ltd., Tokyo/Kobe Textile Machinery Division, Ibaraki, Osaka Toyoda-Sulzer Sales Ltd., Ibaraki, Osaka Toyoda-Sulzer Manufacturing Ltd., Kyowa
<i>South Africa</i>	Sulzer Bros. (South Africa) Ltd., Johannesburg/Durban/Capetown
<i>Algeria</i>	Sulzer Bureau de Liaison Alger, Alger
<i>Middle East</i>	Sulzer Brothers/Escher Wyss, Middle East Consulting Office, Beirut (Lebanon)
<i>Iran</i>	Sulzer Iran (Private Joint-Stock Company), Tehran
<i>S.E. Asia</i>	Sulzer East Asia Central Office, Singapore
<i>Australia</i>	Sulzer Australia Pty. Limited, North Sydney/South Melbourne

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